

PALEOBOTANY.—*The supposed fossil ear of maize from Cuzco, Peru.*<sup>1</sup> ROLAND W. BROWN, U. S. Geological Survey. (Communicated by JOHN B. REESIDE JR.)

Since 1919 the attention of botanists, interested in the origin and evolution of Indian corn, has from time to time been directed to an object (Fig. 5) described by the late Dr. F. H. Knowlton<sup>2</sup> as a fossil ear of maize. Reference to several papers<sup>3</sup> in which the object is further photographed, described, and compared with varieties of maize, shows that the designation of it as a fossil by Knowlton has at least been tentatively accepted as true. It is my purpose now to produce conclusive evidence that this object is not a fossil, and thus I hope to correct as gently and as far as possible an unfortunate paleontologic mistake.

The known historical facts about this object are meager. It was obtained in 1914 by Dr. W. F. Parks, of St. Louis, Mo., from a curio dealer in Cuzco, Peru. Dr. Parks transmitted it to Dr. Walter Hough, Curator of Ethnology in the U. S. National Museum, who gave it to Dr. Knowlton for identification. Knowlton passed it around among his botanical friends, from one of whom, G. N. Collins, of the U. S. Department of Agriculture, he received the helpful suggestion that externally it had a striking resemblance to a variety of Peruvian maize. Knowlton thereupon described the specimen as a supposed new fossil species of maize, calling it *Zea antiqua*, not because he could distinguish it from the living variety it resembled, but for the sake of independent reference.

That Knowlton unreservedly regarded this object as a fossil is implied in his statement concerning its age. He says: "It is of course extremely unfortunate that nothing is known as to the condition under which this specimen was found. If this were known it might be possible to fix its age with a reasonable degree of certainty. As it stands, however, there is little but *the the fact of its thorough fossilization*<sup>4</sup> to base an opinion on, and from this I venture the tentative suggestion that it seems hardly likely to be younger than at least several

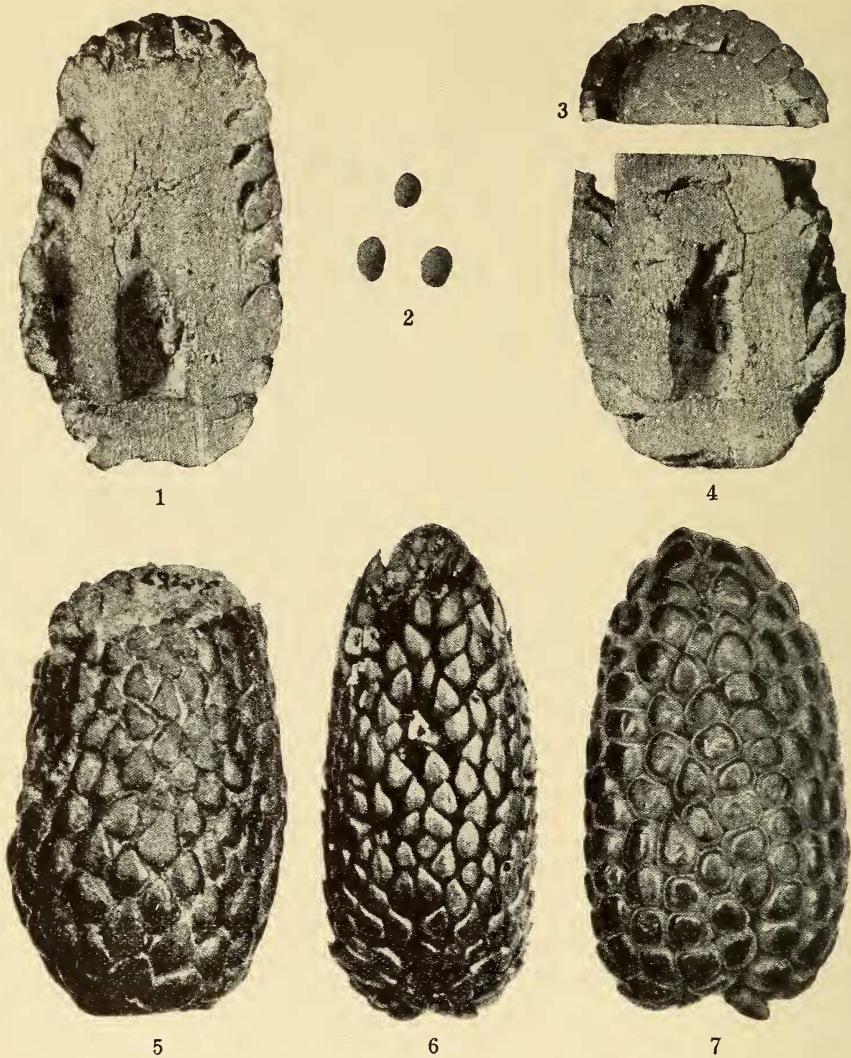
<sup>1</sup> Published by permission of the Director, U. S. Geological Survey. Received Feb. 19, 1934.

<sup>2</sup> KNOWLTON, F. H. *Description of a supposed new fossil species of maize from Peru.* This JOURNAL 9: 134-136. 1919.

<sup>3</sup> COLLINS, G. N. *A fossil ear of maize.* Jour. Heredity 10: 170-172. 1919. *An ear of prehistoric maize that resembles the fossil form, Zea antiqua.* Jour. Heredity 14: 61-64. 1923.

KEMPTON, J. H. *Maize, the plant-breeding achievement of the American Indian.* Smithsonian Sci. Ser., 11: 319-349. 1931.

<sup>4</sup> Italics mine.



Figs. 1, 4. Lengthwise sections through middle of specimen shown in Fig. 5. Walls of cavity in Fig. 4 show tool marks. Fig. 2. Pellets found in cavity at base of specimen. Fig. 3. Transverse section, a top view of specimen shown in Fig. 4. Fig. 5. The supposed fossil ear of maize before cutting. Fig. 6. Ear of maize from a pre-Inca grave at Arica, on the coast of Chile. Found in 1913. Fig. 7. Ear of maize grown by Peruvian Indians in 1925. All figures natural size. Figures 5, 6, 7, by courtesy of J. H. Kempton, Bureau of Plant Industry, U. S. Department of Agriculture.

thousand years." It is most regrettable that Knowlton did not have the object cut, so that he could determine its petrographic nature. That he did not have it cut seems inexplicable, except on the hypothesis that he considered the specimen as the only one of its kind known and therefore hesitated to damage it by sectioning.

The first fermentation past, this matter aged quietly while the type specimen reposed in the paleobotanical collections of the National Museum. Interest in the supposed fossil, however, was revived recently when Dr. R. F. Griggs, Professor of Botany at George Washington University, and one of his students, F. S. MacNeil, of the U. S. Geological Survey, inquired about it. Suspecting from the time I first saw it in 1929 that this object was not a real fossil, I now determined to test my suspicions by having the specimen sectioned. My assistant, K. J. Murata, cut a transverse section (Fig. 3) near the top, a radial lengthwise section (Figs. 1, 4), and prepared a thin section for microscopic examination. These sections show conclusively that the object, instead of being a fossil, is a very cleverly hand-made, low-fired, clay copy of an ear of Peruvian maize, comparable perhaps to the ears shown in Figures 6 and 7.

Looking at the fresh faces made by the cuts one finds these characters: The color is a dull, dirty brown, tinged with red. The matrix can be scratched easily with a knife. To the naked eye it appears homogeneous, except for scattered light-colored grains of quartz and limestone. On the transverse section the supposed cob showing the insertion of the separate kernels is clearly defined. The cob is round-angular, with a smooth margin between the kernels. This fact would be sufficient in itself to discredit the object as a fossil, for if it were a fossil the surface of the cob would be rough, showing contiguous shallow pits or scars where the kernels were attached. The shape, inner surface, and angle of attachment of these kernels suggest that the kernels were separately fashioned. They are of the same material as the core.

The most striking feature on the radial lengthwise faces is the conical cavity near the base. The walls in the upper portion of the cavity show a few deep, oblique indentations, which are clearly the marks of a blunt-edged tool used in shaping the cavity. Three small, smooth, oval pellets (Fig. 2) that before the sectioning caused a faint rattle when the specimen was shaken, were found in the cavity. The significance of the cavity, the pellets, and the rattle, is as conjectural as that of the specimen itself; but other objects with rattles are said to be not uncommon among the artifacts of Central American and South American Indians.

Knowlton observed the fact that the matrix lacks the delicate cellular structure displayed, for example, by many petrified woods. He, however, did not state his theory as to how the object became fossilized but said that the matrix is "a closely cemented, fine-grained

siliceous sand." Actually, microscopic examination of the thin section by Dr. C. S. Ross, of the U. S. Geological Survey, and Miss Anna Shepard, of the Laboratory of Anthropology, Santa Fe, N. Mex., showed that the matrix is a partially baked clay containing a small amount of coarse-grained material. The latter includes free quartz grains, a little feldspar, hornblende, mica, garnet, and zircon, a considerable amount of fine-grained, iron-stained sandstone, limestone, and calcite, and a few fragments of what apparently are reworked bits of clay previously used for pottery. The object was baked at only a moderate temperature, as is demonstrated by the fact that, although the clay has lost its plasticity, the carbon dioxide has not been driven from the limestone and calcite.

I had hoped that a minute examination of this object would show the personal signature of its maker, but I am not convinced that the obscure and delicate striations present in a few spots actually are baked fingerprints. Nevertheless, the object is so clever a copy of an original ear of Peruvian maize that the maker must be credited with having been an artist of superior skill. The questions as to who made this object and when, where, and why it was made must now be referred to the ethnologists and archeologists. The answers may throw some light on the interesting problems concerning the origin and early cultivation of maize.

This episode of a supposed ear of fossil maize may be closed fittingly with the pointing of a moral, particularly pertinent to paleontologists: Be not deceived by external appearances.

ZOOLOGY.—*Affinities of the Brachyuran fauna of the Gulf of California.*<sup>1</sup> STEVE A. GLASSELL, San Diego Society of Natural History. (Communicated by WALDO L. SCHMITT.)

The author having obtained numerous specimens of Brachyura from the Gulf of California during two collecting trips, and having studied the results of other collectors in that region, believes that a brief summary of the fauna of that region in comparison with that of the regions to the north and south would be of general interest to carcinologists.

The interesting relationship of the Panamian fauna to that of the Gulf of Mexico need not be considered here since this has been discussed by Walter Faxon,<sup>2</sup> but the distribution of tropical (Panamian)

<sup>1</sup> Received December 26, 1933.

<sup>2</sup> Mem. Mus. Comp. Zool. Harvard College, 18: 231-50. 1895.